BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 09B

2003 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

July 2003

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South Carolina Department of Health and Environmental Control

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2003 ANNUAL UPDATE

[Data Thru December 2002]

Shellfish Management Area 09B
Shellfish Sanitation Program

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ANNUAL UPDATE
Shellfish Management Area 09B
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Data Inclusive Dates:
01 / 01 / 00 thru 12 / 31 / 02

Classification Change:
___Yes __X__No

Shoreline Survey Completed: Yes

(I)ncreased/(D)ecreased/(N)one:
__N__ Approved
__N__ Cond. Approved
__N__ Restricted
__N__ Prohibited

Prior Report & Date: Annual -2002

SUMMARY

Eight stations within Area 09B exhibited lower fecal coliform geometric mean and/or estimated 90th percentile MPN values subsequent to the 2002 Annual Report. Ten of 16 total stations exceeded the criteria for an Approved classification. Development along the adjacent upland shores and the resulting decrease in permeable surface area will likely continue to influence classification of Area 09B shellfish growing waters.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47 which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred

within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. For Restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred

milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

This sanitary survey evaluates the current harvesting classification of shellfish growing waters designated as Shellfish Management Area 09B (Area 09B). Area 09B consists of approximately 17,105 acres of shellfish growing area habitat located in Berkeley and Charleston Counties, South Carolina. Area 09B extends from the headwaters of the Wando River, located within the Francis Marion National Forest at Ion Swamp, 17 miles southwest to the Wando River's confluence with the Cooper River. Area 09B consists entirely of the Wando River and all of its tributaries, including Alston, Boone Hall, Darrell, Deep, Foster, Guerin, Hobcaw, Horlbeck, Nowell and Wagner Creeks.

The harvesting classifications of Area 09B prior to this sanitary survey were as follows:

Prohibited: (Administrative closure)

1. The Charleston Harbor to Station 15 in the Wando River, including all of Hobcaw Creek;
2. The headwaters of Beresford Creek which is located within Area 09B, Beresford Creek flows into the Cooper River in Area 10B;
3. The Wando River, 1000 feet north of Detyens Shipyard to 1000 feet south of the Halsey Cannon Boatyard.

Restricted:

1. That area of the Wando River from Station 15, extending to Station 02, at the confluence of Horlbeck Creek with the Wando River. This includes all of Rat Hall, Nowell and Beresford Creeks and their tributaries.
2. All of Horlbeck Creek, Boone Hall Creek and all their tributaries from their headwaters to their confluence with Horlbeck Creek at Station 02 in the Wando River.
3. The Wando River from Station 17 to it's headwaters. This includes the tributaries of Guerin, Alston, Darrell, Wagner and Toomer creeks.

Approved:

1. The Wando River from the northern part of its confluence of Horlbeck Creek (approximately 350 meters north of Station 02) to Station 17.

The shellfish industry in South Carolina is based primarily on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams, which include both the northern clam (*Mercenaria mercenaria*) and several small populations of the southern clam (*Mercenaria campechiensis*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include State shellfish grounds, culture permits and Kings Grant areas. The ribbed mussel (*Geukensia demissa*) is also harvested in South Carolina. It is primarily gathered on a small scale by the general public for recreational harvest. The South Carolina Department of Health and Environmental Control will disallow the harvesting of shellfish within Area 09B, for direct marketing purposes, from the restricted waters listed below in the Recommendations.

There is one State Shellfish Ground located within the Restricted waters of Area 09B. The shellfish harvesting season in South Carolina normally extends from mid-September through mid-May. The South Carolina Department of Natural Resources (SCDNR) has the authority to alter the shellfish harvesting season for resource management purposes and grant permits for year-round mariculture operations. Additionally, the South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

CHANGES IN POLLUTION SOURCES

No substantial changes in pollution sources have occurred in Area 09B subsequent to the 2002 Annual Update.

SURVEY PROCEDURES

Shoreline surveys of Area 09B were conducted by the Trident District Shellfish Sanitation staff, by watercraft, vehicle and on foot, during the survey period and are ongoing. Extensive visual examinations of lands adjacent to the waters of Area 09B were conducted to determine potential sources of pollution entering shellfish growing waters.

POINT SOURCE POLLUTION

National Pollutant Discharge Elimination System (NPDES) Permitted Facilities

PERMIT NUMBER	FACILITY NAME	FACILITY TYPE
SC0033022	Detyens Shipyards/Wando Yard	Industrial-Discharge
SC0043273	Mt. Pleasant WW/WTR TTMT	Municipal-Discharge
SCG250160	Cooper Hall Retirement	Industrial-Discharge
SCG730086	French Quarter Group L.P Mine	Industrial-Discharge

A. Municipal and Community Waste Treatment Facilities - There is one permitted wastewater facility that has an outfall within Area 09B. Detyens Shipyards, Inc. operates a sewage waste treatment system located on their property adjacent to the Wando River and Highway 41. The plant receives wastewater generated onsite and from a convenience store located across Highway 41. The treated effluent discharges into the Wando River adjacent to the shipyard. Detyens violated the fecal coliform limits (14/43 MPN) established in their permit two times in 2001. The lowest violation was 56 MPN while the highest was 1,700 MPN. A minimum 1000-foot closure exists around all wastewater outfalls.

The Mount Pleasant Waterworks operates a water treatment plant within the area. The facility discharges into Area 09B, however, the effluent has no fecal coliform loading. Refer to the Potential Pollution Sources map included in this report (see Table 4).

In May of 2002, Mount Pleasant Waterworks reported a force main pipe failure at pump station #72 near Horlbeck Creek. The pump station released approximately 1,000 gallons of

untreated sewage. The effluent entered a retention pond in Dunes West. Also in May of 2002, Mount Pleasant Waterworks reported a float failure at pump station #109. The overflow allowed approximately 14,500 gallons of untreated sewage to be spilled near Palmetto Hall Blvd. Neither of these overflows entered into the shellfish growing waters of Area 9B.

B. **Industrial Waste (Discharges)** - There is one permitted industrial discharge located within the boundaries of Area 09B. The French Quarter Group operates a borrow pit located along the northern portion of the area, adjacent to Highway 41. The permit was issued for de-watering activities that may be necessary during normal operations. There is a second facility located within the area, however, the discharge is to a creek that empties into Area 10B. The Cooper Hall Retirement facility, located in Mount Pleasant, discharges excess water from their HVAC system. The effluent, which is primarily condensate, drains to Shem Creek and eventually into Charleston Harbor. In addition, there are multiple NPDES permitted outfalls located throughout adjacent Area 10B.

C. **Marinas** - S.C. Regulation 61-47, Shellfish defines *Marina* as "any water area with a structure (docks, basin, floating docks, etc.) which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space." Area 09B supports a wide variety of boating facilities. Hobcaw View Marina, located on Hobcaw Creek, provides dockage for approximately 25 boats and allows for another 10 moorings within the creek. No fueling or pump out facilities are provided. Two marine repair facilities are located on the Wando River. Detyens Shipyard is located on the south side of the Wando River, approximately 900 feet northwest of the S. C. Highway 41 Bridge, near Cainhoy. Detyens has three large dry docks and provides repairs to ships 200 to 300 feet in length. Halsey Cannon Boatyard, located across the river from Detyens and adjacent to S.C. Highway S-8-26, provides repairs to recreational boats ranging in size from 15 to 30 feet. The S.C. Ports Authority operates the Wando Terminal located on the eastern shore of the Wando River approximately three miles from the Wando and Cooper River confluence. The terminal loads/unloads intercontinental transport cargo vessels on a weekly basis. There are no commercial fisheries docks within Area 09B. Closure zones exist around all marinas within the area.

D. **Radionuclides** - Sources of radionuclides have not been identified within Area 09B, and radionuclide monitoring has not been conducted. No other sources of poisonous or deleterious substances have been identified within the area.

NONPOINT SOURCE POLLUTION

A. **Urban and Suburban Stormwater Runoff** - A shoreline survey conducted in Area 09B revealed the highest concentration of homes to be along the Mount Pleasant side of the Wando River. Single family homes continue to be built along the south side of the Wando River between Guerin Creek and the Paradise Island Boat Landing. Multiple housing developments

are being built adjacent to Station 8. Residential subdivisions start at the Wando Terminal and continue northward along the Wando River.

Currently there are new homes and/or docks under construction in Alston, Boone Hall, Guerin, Nowell and Rat Hall Creeks. Stormwater runoff adversely impacts water quality by transporting fecal coliform bacteria from land to the shellfish growing area.

Stormwater permits may be used as an indicator of land disturbing activities. Approximately 94 stormwater permits have been issued within Area 9B through 2002. The majority of these permits are concentrated in the Mount Pleasant area and have been issued to construction sites and/or housing subdivisions. The remainder have been issued for stormwater control at schools, churches and small businesses. These areas are depicted on the attached Potential Pollution Source Map.

A dredge spoil area is located on the southern most portion of Daniel Island, located at the mouth of the Wando River. The Army Corps of Engineers conducted one dredging project in Area 09B during 2002. The area between Charleston Harbor and the Wando Terminal was dredged during 2002. The S.C. State Ports Authority also conducts its own maintenance dredging directly in front of the Wando Terminal on an as needed basis.

The uplands surrounding the shellfish growing waters of Area 09B consist of various soil textures. These have been defined by the United States Department of Agriculture (USDA), Soil Conservation Service (Berkeley Co.1980 & Charleston Co.1971) utilizing general classifications and descriptions. Although lands within Area 09B, along the Berkeley County side of the river, consist of numerous soil types, the area is generally comprised of Chipley-Echaw-Pickney soils, made up of nearly level soils on long, narrow to broad ridges in areas roughly parallel with the coastline. The USDA (1980) further describes these soils as "Moderately well drained and very poorly drained soils that are sandy throughout." The upland area along the Charleston County side of the river consists of numerous soil types, the area is generally comprised of soils in the Yonges series. Soils of this series typically occur on a low, swamp-like plain and on islands of higher areas that separate and parallel major streams. The USDA (1971) further describes these soils as “Poorly drained to very poorly drained, level to nearly level soils that have a loamy to sandy surface layer and a loamy to clayey subsoil.”

B. **Agricultural Runoff** - There are no permitted agricultural facilities located in Area 09B. The shoreline survey found a residence adjacent to Station 5 that has a pasture that occasionally contains two to four horses. The shoreline survey also revealed approximately eight cows one to two miles upstream from Station 6. Area 09B serves as a drainage basin for southwestern portions of the Francis Marion National Forest.

C. **Individual Sewage Treatment and Disposal Systems** - The Snowden Subdivision, located at the headwaters of Mount Pleasant’s Foster Creek, has the only large concentrated area of individual septic systems within Area 09B. The Boone Hall Recreation area, adjacent to Station

7, continues to use a septic system. Approximately five homes remain on septic tanks along Horlbeck Creek. Paradise Island has approximately 18 residences served by septic systems. There are multiple homes located north of station 6 that are within the confines of the national forest that are also on individual septic systems. Each system requires inspection and approval by the Division of Environmental Health, Trident Health District, prior to final installation.

D. **Wildlife and Domestic Animals** - Area 09B supports a large population of domestic animals attributable to a number of private residences along the shores of the Wando River. The area supports a moderate amount of wildlife along the northern border that extends into the Francis Marion Forest. The area has many small tidal creeks. This creek system provides a possible conduit for animal fecal coliform bacteria to be transported to the adjacent growing waters.

E. **Boat Traffic** - Recreational boat traffic is moderate throughout the area between the months of November and April and heavy between the months of May and October. Commercial boat traffic ranges from fisherman collecting blue crabs to large commercial cargo vessels utilizing the S.C. Ports Authority Wando Terminal.

F. **Hydrographic and Habitat Modification** - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval. Portions of the Wando River from the Charleston Harbor to the I-526 Bridge require regular maintenance dredging. The U.S. Army Corps of Engineers utilizes designated tracts of land adjacent to the Cooper River as dredge spoil sites.

G. **Marine Biotoxins** - Bivalve shellfish contamination from marine biotoxins has not been shown to be a human health concern within Area 09B. The Department participates in a State Task Force on Toxic Algae and maintains a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 09B is comprised of the Wando River and associated deep-water tributaries and marshlands. The creeks within the area range from 30 to 450 feet in width and average 5 to 25 feet in depth. The shipping channel near the Wando Terminal is maintained at a mean low water depth between 37 and 40 feet by the US Army Corps of Engineers. Freshwater flows into the area from the Francis Marion National Forest and associated creeks. High salinity ocean water enters the area from the Charleston Harbor. The entire area is approximately eight miles wide (northwest to southeast) and nineteen miles long (southwest to northeast).

Tides - Tides in Area 09B are semidiurnal, consisting of two low and two high tides occurring each lunar day. Mean tidal ranges in the Wando River at the Highway 41 Bridge are 6.2 feet during

normal tides and 8.0 feet during spring tides. Wind direction and intensity, as well as atmospheric pressure, typically cause variations in predicted tidal ranges.

Rainfall - Precipitation in Area 09B is heaviest during late summer and early autumn. Tropical storms and hurricanes occasionally produce extremely large amounts of rainfall. During winter months heavy rainfall events are uncommon, yet occasional intense thunderstorms associated with rapidly moving low-pressure systems generate heavy rains. Precipitation rarely occurs in the form of snow or ice. Spring weather patterns may be dynamic with associated thunderstorms and severe weather conditions.

The 30-year average for rainfall in Charleston, recorded at the Charleston Airport, is 50.74 inches. The 2002 precipitation total recorded in Mount Pleasant was 76.9 inches. July through October had a total of 35.0 inches of rain. This represents 46% of the total rainfall recorded for the year.

Winds - Prevailing winds along the central portion of the South Carolina coast are from the south and west during spring and summer and from the north during autumn and winter. Wind speeds are generally less than 15 miles per hour (mph); however, strong weather systems may generate winds in excess of 25 mph. Tropical storms and hurricanes occur occasionally.

River Discharges - The Wando River receives freshwater from two primary sources. The first is freshwater flowing into the mouth of the Wando River from the Cooper River. The second is runoff from the Wando River watershed.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 09B in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July 1998, an updated shellfish water quality data scheduling and collection procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station, yet provides a six-sample cushion (above the NSSP required 30 minimum) for broken sample bottles, lab error, breakdowns, etc. This also allows each

annual report's water quality data to meet the requirements for the NSSP Triennial Review sampling criteria.

564 surface water quality samples (<1.0 ft. deep) were collected for bacteriological analyses from 16 active water quality sampling stations in Area 09B during the period 01/01/00 through 12/31/02. Of this total, 558 routine samples were collected for classification purposes in accordance with the Department's SRS plan. The samples were collected in 120 ml amber glass bottles, immediately placed on ice and transported to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. At the laboratory, sample sets exceeding a 30-hour holding time or containing a temperature control in excess of 10 degrees C. were discarded (APHA, 1970).

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using an automatic temperature compensated refractometer. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined by using Nautical Software's *Tides & Currents*, Version 2 (1996).

MONITORING RESULTS

Stations that exceeded a fecal coliform geometric mean MPN value of 14 were 4, 5, 6, 7, 9 and 10. No station exceeded a fecal coliform geometric mean MPN value of 88. The stations within Area 09B exceeding a fecal coliform MPN estimated 90th percentile value of 43 were 4, 5, 6, 7, 9, 10, 11, 12, 16, 18 and 19. Station 9 exceeded an estimated 90th percentile fecal coliform MPN value of 260.

CONCLUSIONS

Based on review of fecal coliform bacteriological data and the pollution source survey, Area 09B is impacted by one primary source of actual or potential pollution.

NONPOINT SOURCE RUNOFF

Nonpoint source runoff appears to be a major source of fecal coliform bacteria concentrations throughout the Area 09B. Development within the management area continues at a rapid pace.

RECOMMENDATIONS

The shoreline survey and bacteriological data review of shellfish growing Area 09B indicate that current classification boundary descriptions are appropriate. The harvesting classification of Area 09B for this sanitary survey will be as follows:

Prohibited: (Administrative closure)

1. The Charleston Harbor to station 15 in the Wando River, including all of Hobcaw and Molasses Creek;
2. The headwaters of Beresford Creek which is located within Area 09B, Beresford Creek flows into the Cooper River in Area 10B;
3. The Wando River, 1000 feet north of Detyens Shipyard to 1000 feet south of the Halsey Cannon Boatyard.

Restricted:

4. That area of the Wando River from Station 15, extending to Station 02, at the confluence of Horlbeck Creek with the Wando River. This includes all of Rat Hall, Nowell and Beresford Creeks and their tributaries.
5. All of Horlbeck Creek, Boone Hall Creek and all their tributaries from their headwaters to their confluence with Horlbeck Creek at Station 2 in the Wando River.
6. The Wando River from Station 17 to it's headwaters. This includes the tributaries of Guerin, Alston, Darrell, Wagner and Toomer creeks.

Approved:

1. The Wando River from the northern part of its confluence of Horlbeck Creek (approximately 350 meters north of Station 02) to Station 17.

Deep Creek is classified as Restricted with the condition that no shellstock may be taken for depuration in the vicinity of stations 04, 09, and 12, nor shall the area be utilized as a water source for depuration operations.

Station Additions/Deactivations/Modifications:

None

Analysis of sampling data for Area 09B demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24 hour period. Therefore, a precautionary closure of Area 09B will be implemented following rainfall events of greater than 4.00" in a 24 hour period, as measured at the Mount Pleasant Waterworks, Rifle Range Road facility located in Mount Pleasant. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States has been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (*National Weather Service*). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52 and 53 (*National Research Council, 1985*).

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TABLE #1
Shellfish Management Area 09B
Water Quality Sampling Stations Description

Station	Description
01	Wando River at Nowell Creek
02	Wando River at Horlbeck Creek
04	Wando River at Deep Creek
05	Wando River opposite Big Paradise Island
06	Wando River at Paradise Boat Landing
07	Boone Hall Creek opposite County Recreation Area
08	Wando River at Marker #29
09	Deep Creek - 1 mile from confluence with Wando River
10	Wando River at Alston Creek confluence
11	Wando River at Guerin Creek
12	Guerin Creek at Old House Creek
15	New bridge- Route I-526
16	Confluence of Martin Creek and Nowell Creek
17	Wando River midway between Stations 3 and 11 (at old dry dock)
18	Rat Hall Creek at confluence with Wando River
19	Foster Creek at confluence with Wando River

(Total 16)

Figure 1.

Shellfish Management Area 09B Prior Classification

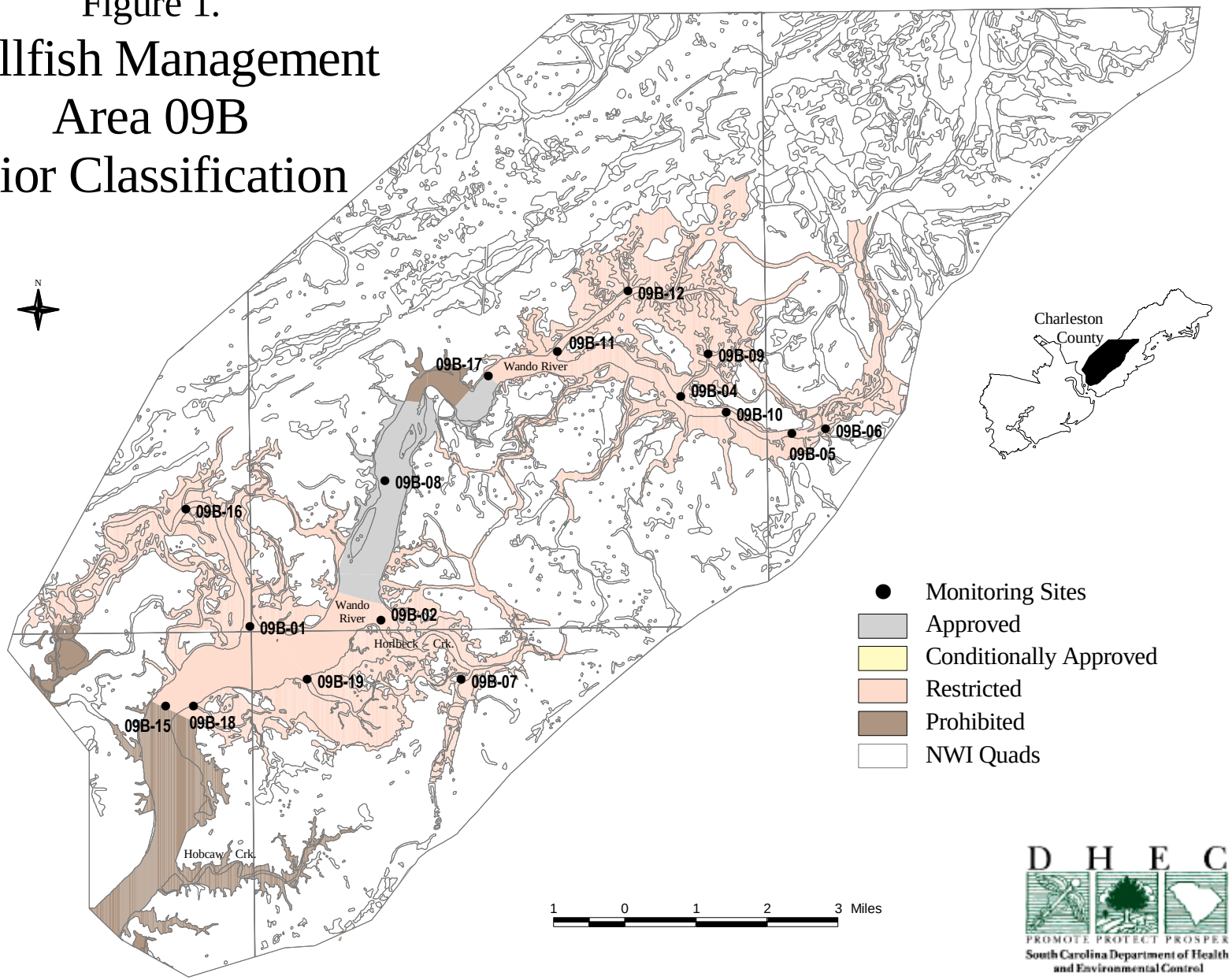

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Figure 2.

Shellfish Management Area 09B Current Classification

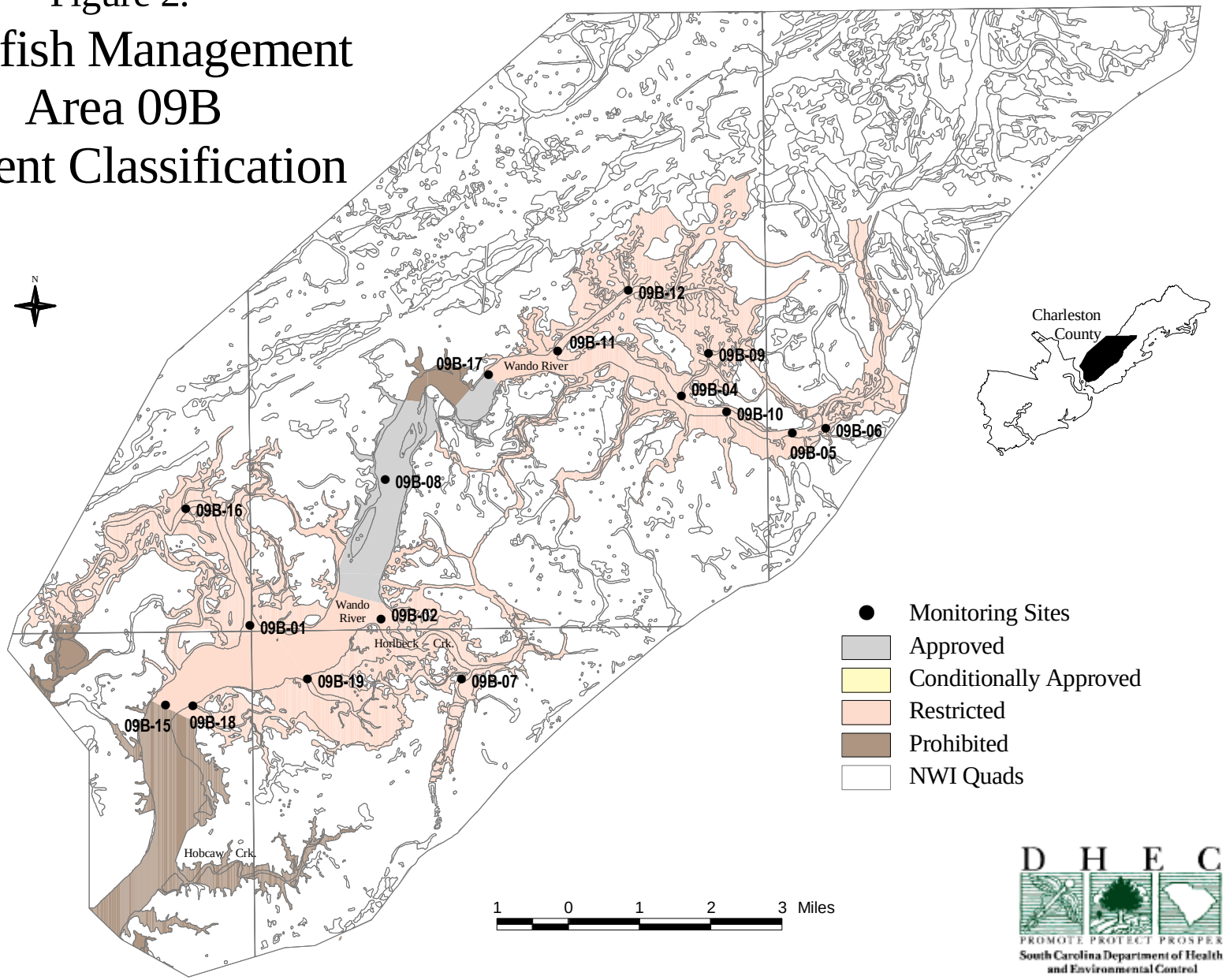

Figure 3.
Shellfish Management Area 09B
Potential Pollution Sources

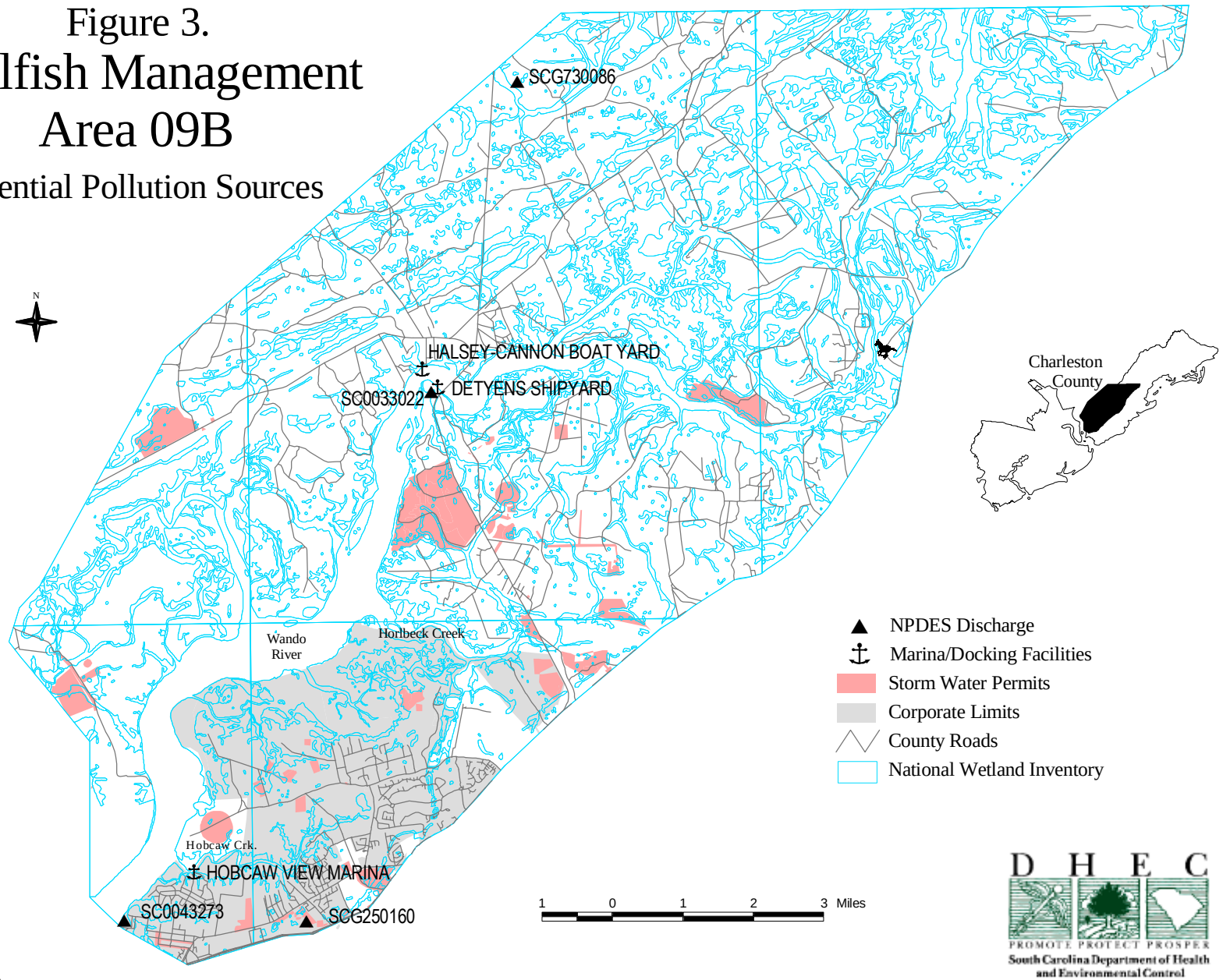

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TABLE #2
Shellfish Management Area 09B

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
from Shellfish Water Quality Sampling Stations between

January 1, 2000 and December 31, 2002

Station #	1	2	4	5	6	7	8	9	10	11
SAMPLES	35	35	34	35	35	35	35	35	35	35
GEOMEAN	6.2	5.8	24.8	16.6	24.8	28.7	3.9	41.7	19.6	9.3
90TH %ILE	17	27	260	99	128	168	11	396	136	50
WATER QLTY	A	A	R	R	R	R	A	RND	R	R
CLASSIFICATION	R	R	R	R	R	R	A	RND	R	R

Station #	12	15	16	17	18	19				
SAMPLES	35	35	34	35	35	35				
GEOMEAN	13.3	5.8	10.3	6.2	12.6	9.3				
90TH %ILE	77	22	63	23	84	59				
WATER QLTY	R	A	R	A	R	R				
CLASSIFICATION	R	P	R	R	R	R				

Station #										
SAMPLES										
GEOMEAN										
90TH %ILE										
WATER QLTY										
CLASSIFICATION										

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** - Prohibited

TABLE #3

Water Quality
Sampling Stations Data

Shellfish Management Area 09B

BACTERIOLOGICAL DATA

Data for each shellfish station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained through South Carolina's Department of Health and Environmental Control - Freedom of Information office at the address below.

Freedom of Information
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2000	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1									1.00			
2								0.40	1.50			0.10
3			0.30						0.90			
4			0.40			0.50		0.80	1.20		0.10	
5									1.20			
6	0.10						0.20					
7	0.20						0.30		0.40			
8				0.30								
9												0.80
10	0.30											
11								3.30				
12							1.30					
13		0.70					1.10	0.50				
14		1.10		0.50			0.10					0.10
15												
16			0.70									
17				0.30					4.10			
18								1.30	0.10		0.40	
19	0.20		0.20								0.90	
20	0.30		1.50						0.10			
21									0.10			
22									0.50			
23	0.30						0.30	0.10				
24	1.00			0.30			1.10	0.30			0.30	
25							0.30				0.90	
26												
27			0.30					0.40				
28	0.20							0.30				1.00
29	0.50			0.20		1.20	1.90	0.50				
30	0.30		0.20				1.50					
31							0.20					

(Monthly Figures) **Year's Rainfall Total:** **44.00**

SUM	3.40	1.80	3.60	1.60	0.00	1.70	8.30	7.90	11.10	0.00	2.60	2.00
MAX	1.00	1.10	1.50	0.50	0.00	1.20	1.90	3.30	4.10	0.00	0.90	1.00
MIN	0.10	0.70	0.20	0.20	0.00	0.50	0.10	0.10	0.10	0.00	0.10	0.10
AVG	0.34	0.90	0.51	0.32	0.00	0.85	0.75	0.79	1.01	0.00	0.52	0.50

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

TABLE #4

Rainfall Data

Shellfish Management Area 09B

SOURCE:
Mount Pleasant Waterworks and Sewer Commission

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2001	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1						1.00	0.80					
2							1.80		1.50			
3		0.10	0.30						0.20			
4		0.20					0.30		1.50			
5								0.90				
6										0.20		
7						0.50			0.30			
8	0.30											
9						1.40			0.20			
10												2.50
11		0.50							0.10			
12	0.50	0.40	0.70				1.80					0.05
13		0.10		0.10		0.40		1.60				0.20
14			0.20			0.30		0.20	0.10	0.40		
15			1.30									
16												
17												
18								0.80				
19								0.60				
20			2.10			0.90	3.10	1.20		0.30		
21		0.60				0.10						
22	0.20				0.70		0.30					
23							0.60				0.60	
24									0.30		0.50	
25			0.20	0.40								
26					0.50		0.20					
27		0.10					5.00					
28			0.30		1.30		0.70					
29			0.30		0.30		0.30					
30	0.10						0.10					
31												

(Monthly Figures) **Year's Rainfall Total:** **45.65**

SUM	1.10	2.00	5.40	0.50	2.80	4.60	15.00	5.30	4.20	0.90	1.10	2.75
MAX	0.50	0.60	2.10	0.40	1.30	1.40	5.00	1.60	1.50	0.40	0.60	2.50
MIN	0.10	0.10	0.20	0.10	0.30	0.10	0.10	0.20	0.10	0.20	0.50	0.05
AVG	0.28	0.29	0.68	0.25	0.70	0.66	1.25	0.88	0.53	0.30	0.55	0.92

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2002	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.90	0.10			0.10	0.50			
2			0.10					0.10				
3	0.20		2.50						0.50			
4			0.10		0.40							
5					0.20		0.20				0.30	
6	0.20						0.30	0.20	0.10		1.60	0.30
7	0.50	1.60					1.00	0.20			0.20	
8		0.40				0.10				1.00		
9			0.20				0.30			3.50		
10		0.50		0.20						0.30		1.00
11		0.30		2.10						1.20	1.50	0.30
12				0.10						0.90	0.90	
13	1.00		0.50				0.50				1.70	1.00
14					0.70					0.70		
15	0.50					0.30	1.30	0.10		1.30		
16		0.10							0.60	0.30		
17											1.00	
18								0.20			0.20	
19					1.00	3.50						0.20
20					0.20	0.10						0.70
21		0.50				2.00						
22			0.70			1.30	0.10	0.20		0.30		
23		0.10				4.50	3.50					
24							0.10					
25								0.40	0.10	0.10		1.80
26	0.20							0.30	4.80			
27			0.30					1.00	0.40			
28				0.10				1.50				
29								0.90		0.40		
30								3.80		0.20		
31			0.90					1.50				

(Monthly Figures) **Year's Rainfall Total: 76.90**

SUM	2.60	3.50	5.30	3.40	2.60	11.80	7.30	10.50	7.00	10.20	7.40	5.30
MAX	1.00	1.60	2.50	2.10	1.00	4.50	3.50	3.80	4.80	3.50	1.70	1.80
MIN	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20
AVG	0.43	0.50	0.66	0.68	0.43	1.69	0.81	0.75	1.00	0.85	0.93	0.76

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)